Micro XANES Study of Chromate Conversion Coating Homogeneity and Aging on AA2024-T3 *	X26A

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This analysis is part of a larger study on the mechanisms of chromate conversion coatings on aluminum aircraft alloys. A better understanding of these mechanisms will aid in the development of non-chromate alternatives. Micro XANES (and XRF) were performed on samples of AA2024-T3 at the CrK edge (5989 eV) following various pre-treatments and a 10 second, 10 degree C application of Alodine, a commercial chromte conversion coating complex. A sample was also freshly treated with Alodine at room temperature for 180 seconds and allowed to age while being periodically analyzed for twenty four hours. Preliminary data from these experiments indicate (1) that method of pretreatment effects the Cr(VI)/Cr(III) ratio in the chromate conversion layer, and (2) that little change takes place in the Cr(VI)/Cr(III) ratio during the initial twenty four hours of aging.

The pretreatments and the relative amounts of Cr(VI) seen in the spectra were as follows: (i) Sanchem 1000, a commercial deoxidizer: Cr(VI) peak not discernible; (2) Sanchem 1000 coupled with a Pt mesh electrode: Cr(VI) peak not discernible; (3) 8 percent KOH (12 sec.) followed by 50 vol. percent nitric acid (15 sec.) surface treatment: approximately 3 to 6 percent Cr(VI), and (4) electropolished in 25 vol percent nitric acid and methanol: approximately 6 to 10 percent Cr(VI). These differences are significant, since the remaining Cr(VI) may play a role in repassivation at sites of coating damage. Though no major change in the Cr(VI)/Cr(III) ratio was detected by XANES during a twenty four hour aging, additional techniques, including far infraed spectroscopy and EXAFS, will be used to look for structural and chemical changes during the aging process.

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